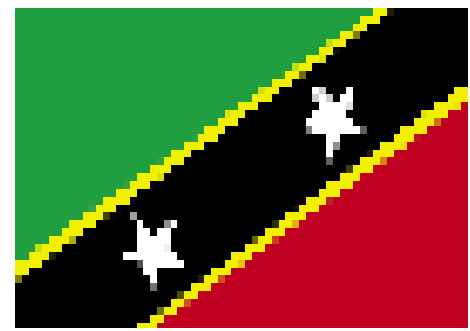




# Eastern Caribbean

20°





# Federation of St Kitts and Nevis First Geothermal Powered Nation in the World



# West Indies Power

- West Indies Power (WIP) is the developer and operator of the Nevis Geothermal Power Plant.
- WIP is a private independent power producer owned by Caribbean and American interests.
- WIP's major European investors were recently bought out by Renova Capital Partners of the United States
- All power from the power plant is sold under a long term Power Purchase Agreement to Nevis Electricity Company (NEVLEC)



# Chronology

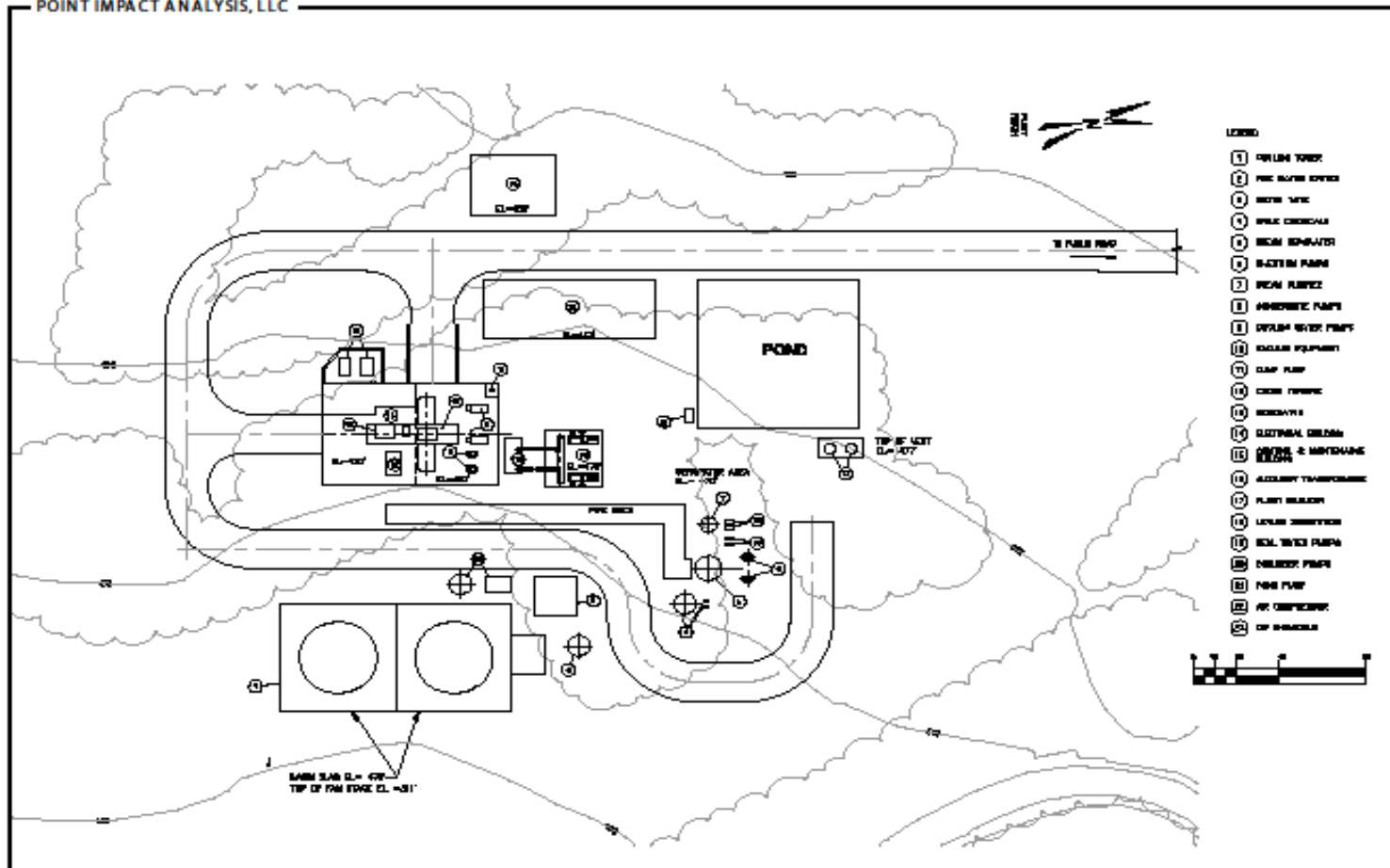
- 2006 WIP awarded Geothermal Exploration Contract
- 2007 Exploration Work Completed
- 2008 Three Slim holes drilled discovering the 300+MW geothermal resource on Nevis
- 2009 Well field and geothermal power plant design completed
- 2010 Engineering and funding



# Plant

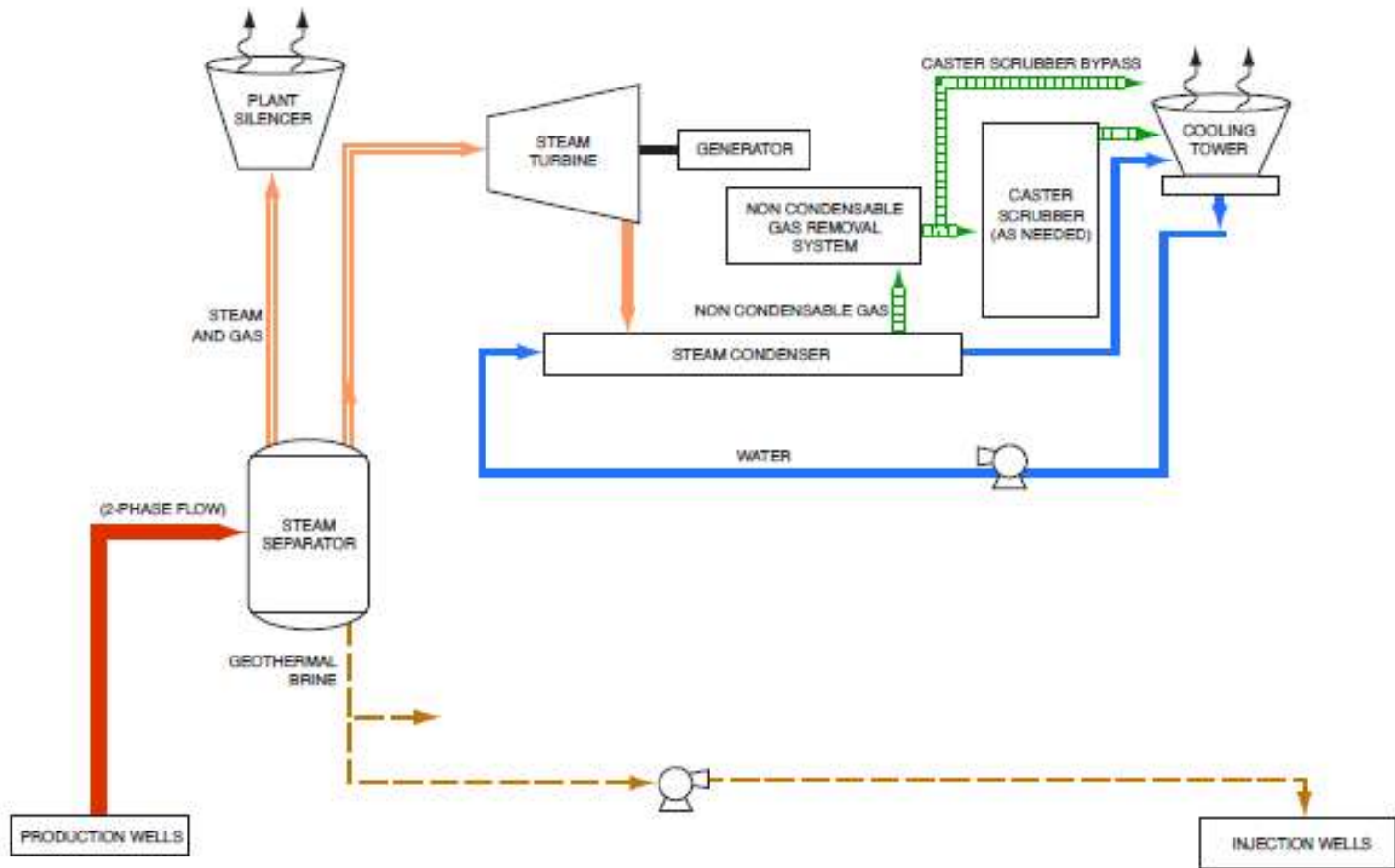
- CL 122 GE Single Flash Turbine
- Gross generation capacity 15MW
- Net Generation Capacity 8MW
- Operated at Cove Fort, Utah
- Refurbished and guaranteed by TurboCare, a division of Siemens and Geothermal Development Associates
- Design and Engineering supplied by Process Unlimited and Power Engineers
- All power generated sold to Nevis Electricity Company (NEVLEC) under a long term Power Purchase Agreement





Source: Processes Unlimited International, Inc.

Nevis Geothermal  
Development Project  
FIGURE 3.6-1  
POWER PLANT  
GENERAL ARRANGEMENT



**Legend**

- |                    |                  |
|--------------------|------------------|
| Steam and Gas      | Motive Fluid     |
| Noncondensable Gas | Geothermal Brine |
| Water              | 2-Phase Flow     |

Nevis Geothermal Development Project  
**FIGURE 3.3-1**  
**BLOCK FLOW DIAGRAM**



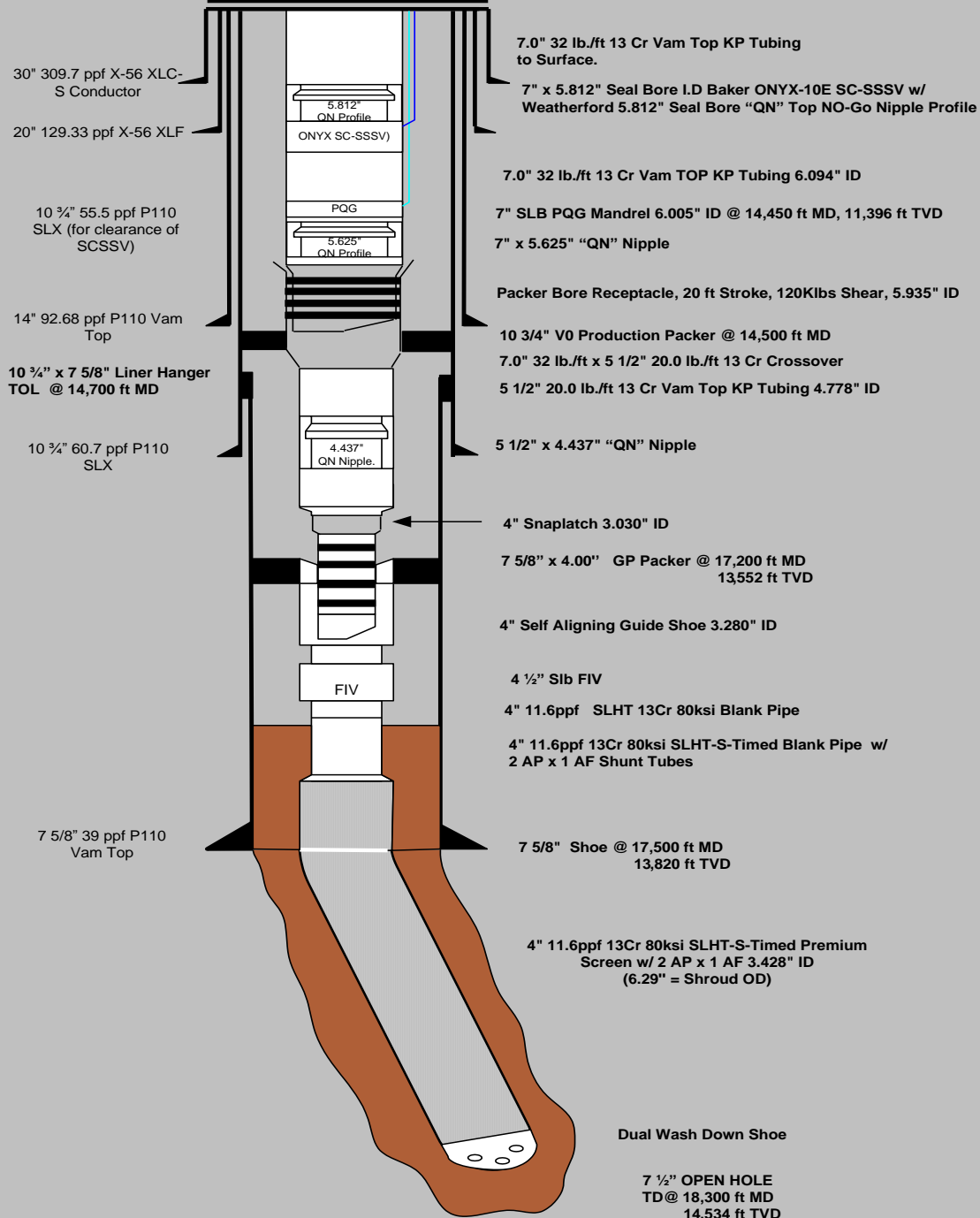
# Well field

- Production Drilling Contractor : Just Hot Resources from the United States. Over 30 years experience in geothermal wellfield development
- Wells: Two 5000 ft 97/8 inch production holes that are expected to produce 5MW-10MW each. One 6000 ft 97/8 inch injection well
- Wells will take 60 days each to drill and test.
- Testing by ThermoChem



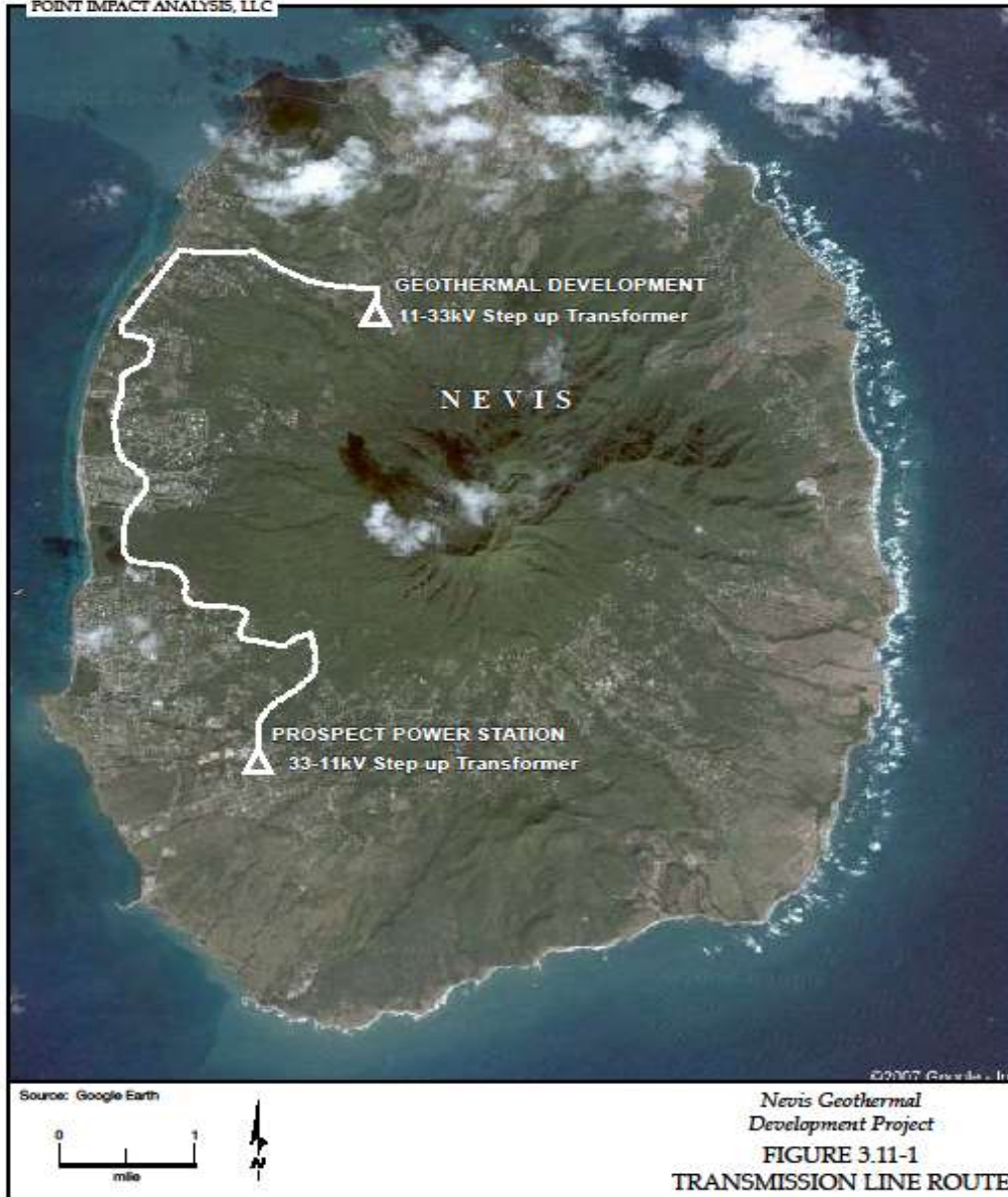


**Vetco Grey**  
**18-3/4 10M WELL HEAD SYSTEM W/ 6-3/8" 6,500 PSI TREE**



# Nevis Substation and Power Line

- New 33 kv substation at Spring Hill
- 8 miles of buried 33 kv cable between Spring Hill and existing Prospect Power Plant which is the existing electrical distribution center for the island
- Upgrading protection at Prospect Power Plant
- Will be operated by NEVLEC



Nevis Geothermal  
Development Project  
FIGURE 3.11-1  
TRANSMISSION LINE ROUTE



# Nevis Schedule

- Environmental Impact Assessment filed and is anticipated to be approved in February 2011
- EXIM funding final approval in 2<sup>nd</sup> Qt 2011
- Well field civil work begins in 2<sup>nd</sup> Qt 2011
- Production Drilling begins in 2<sup>nd</sup> Qt 2011
- Plant Construction begins in 2<sup>nd</sup> Qt 2011
- Substation/power line construction begins 3<sup>rd</sup> Qt
- Turbine/Generator and Balance of Plant delivered in 4<sup>th</sup> Qt 2011
- Drilling finished in 4<sup>th</sup> Qtr 2011
- Plant installation completed 3<sup>rd</sup> QT 2012
- Start Up 3 Qt 2012



# Nevis Funding

- The Export Import Bank of the United States (EXIM) has offered to provide the approximate USD\$55MM debt funding for the project
- Equity funding in the amount of USD\$12MM was provided by WIP
- Environmental Impact Assessment (EIA) approved by the Nevis Island Administration (NIA) on April 15, 2011
- EIA was filed in December 2010
- NIA approved USD\$55MM Guarantee of EXIM loan on April 28, 2011
- EXIM Board Approval is expected in May 2011



# St Kitts

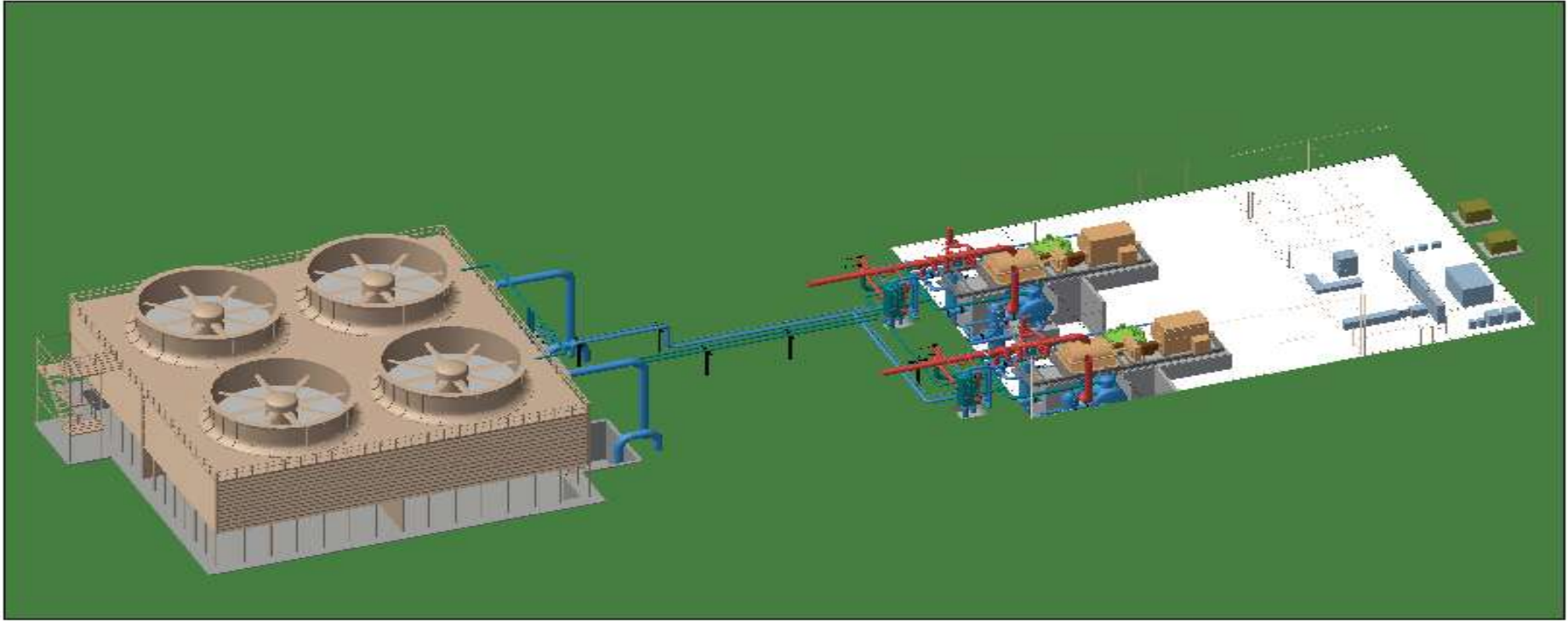
- Letter of Intent signed between Nevlec and St Kitts Electricity Department to supply St Kitts with geothermal power from the WIP Nevis geothermal plants via a 2 mile HVAC submarine cable and other transmission.
- Request from WIP for Geothermal Development License for St Kitts filed.

# St Kitts Proposed Project

- 6 Production wells and 2 Injection wells at Spring Hill, Nevis
- 2x25 MW single flash geothermal power plant
- 1 90 kv substation at Spring Hill, Nevis
- 1 mile 90kv cable between Spring Hill and Cades Bay, Nevis
- 2 miles 90kv HVAC buried submarine cable between Cades Bay, Nevis and Majors Bay, St Kitts
- 1 90 kv substation at Majors Bay, St Kitts
- 8 miles 90 kv cable between Majors Bay and Needsmutt Power Station, St Kitts
- 90 kv substation at Needsmutt Power Station, St Kitts



# Single Flash Geothermal Power Plant



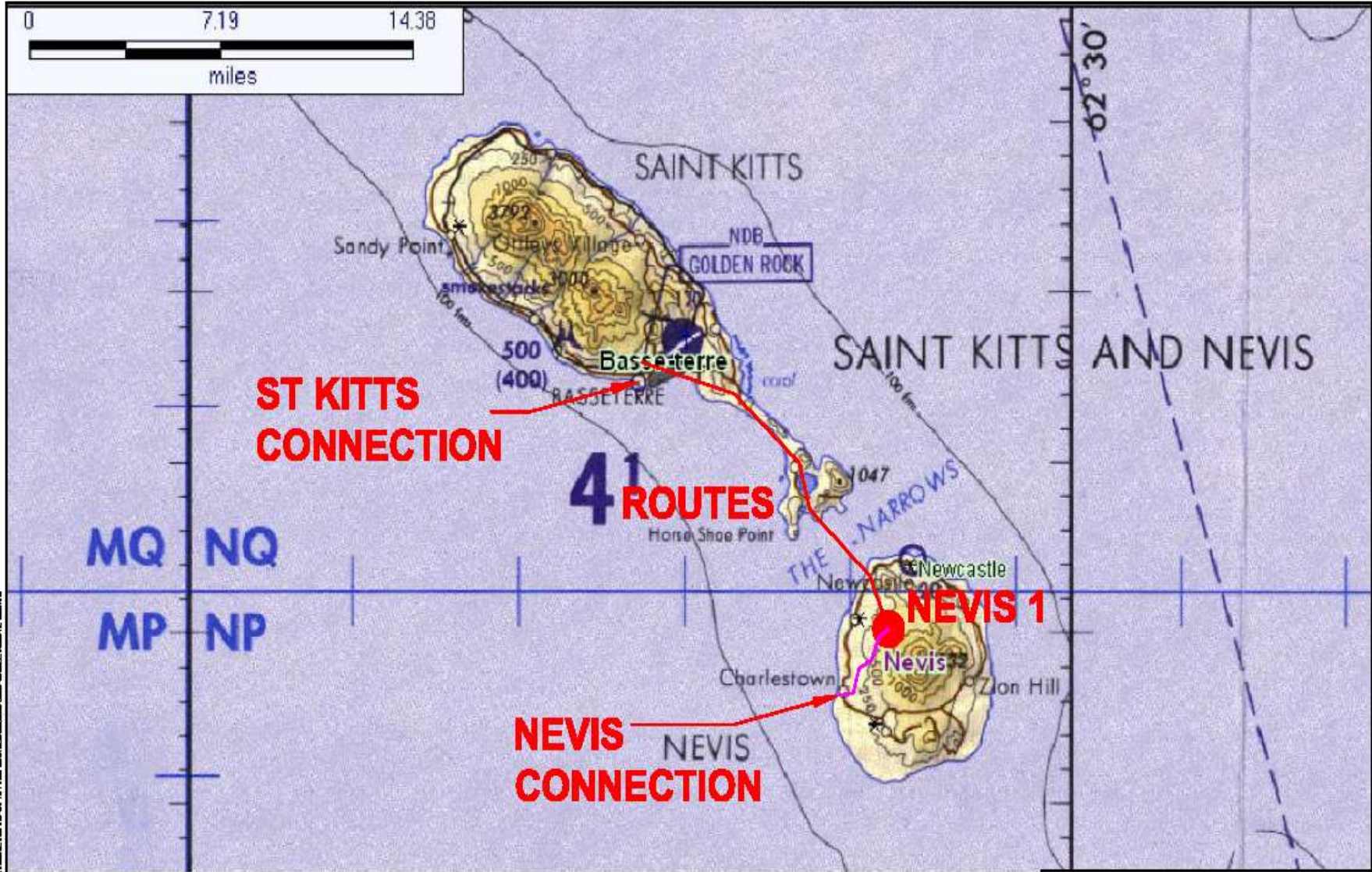
CONCEPTUAL ISOMETRIC VIEW  
NEVIS 2 x 17 MW

PRELIMINARY

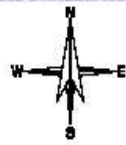
25 APRIL 2008

In Single Flash plants, the hot water is separated from the steam which goes to operate the turbine.





NOTES:  
 Base map courtesy of Map Mart:  
<http://216.241.101.9/international/default.aspx?Page=resolution>



**HALEY & ALDRICH** NEVIS TO ST KITTS  
WEST INDEX

PROPOSED CABLE ROUTE  
LOCUS

SCALE: AS SHOWN  
28 AUGUST 2008

FIGURE



CABLE ROUTE LOCUS DRAWN BY WIP

# St Kitts Schedule

- Sign PPA with St Kitts in 2011
- Fund Project in 4<sup>th</sup> Qt 2011
- Order 90kv submarine cable in 1<sup>st</sup> Qt of 2012
- Commence drilling 6 production and 2 injection wells in 4th Qt 2011
- Order 2x25 MW Geothermal Plant to supply St Kitts in 1<sup>st</sup> Qt 2012
- Commence Geothermal Plant construction in 2<sup>nd</sup> Qt 2012
- Commence transmission work on St Kitts and Nevis 2nd Qt 2012
- Commence plant installation in 1st Qt 2013
- Start up of 50MW St Kitts Plant 3rd Qt 2013
- Install submarine cable 3<sup>rd</sup> Qt 2013
- St Kitts 35MW Plant will start up 4th Qt 2013



# St Kitts Funding

- The Export Import Bank of the United States (EXIM) has expressed interest to provide the approximate USD\$100MM debt funding for the project
- Equity funding in the amount of USD\$25MM will be provided by WIP
- EXIM and WIP are waiting for the signing of a Power Purchase Agreement between St Kitts Electricity Department and Nevlec and the amendment of the existing WIP/Nevlec PPA to account for the changes associated with the supply of power to St Kitts.



# Geothermal Benefits

- Continuous Base Load Power
- Lower Cost Electricity
- Less imported fuel
- Revenues from Export of Electricity to Other Islands
- Agriculture Production
- Mineral Production
- High tech Industries
- Tourism



Come visit St Kitts and Nevis  
The first totally Green Nation in the World

Thank You

For more information contact:  
Kerry McDonald  
[k.mcdonald@westindiespower.com](mailto:k.mcdonald@westindiespower.com)  
[www.westindiespower.com](http://www.westindiespower.com)



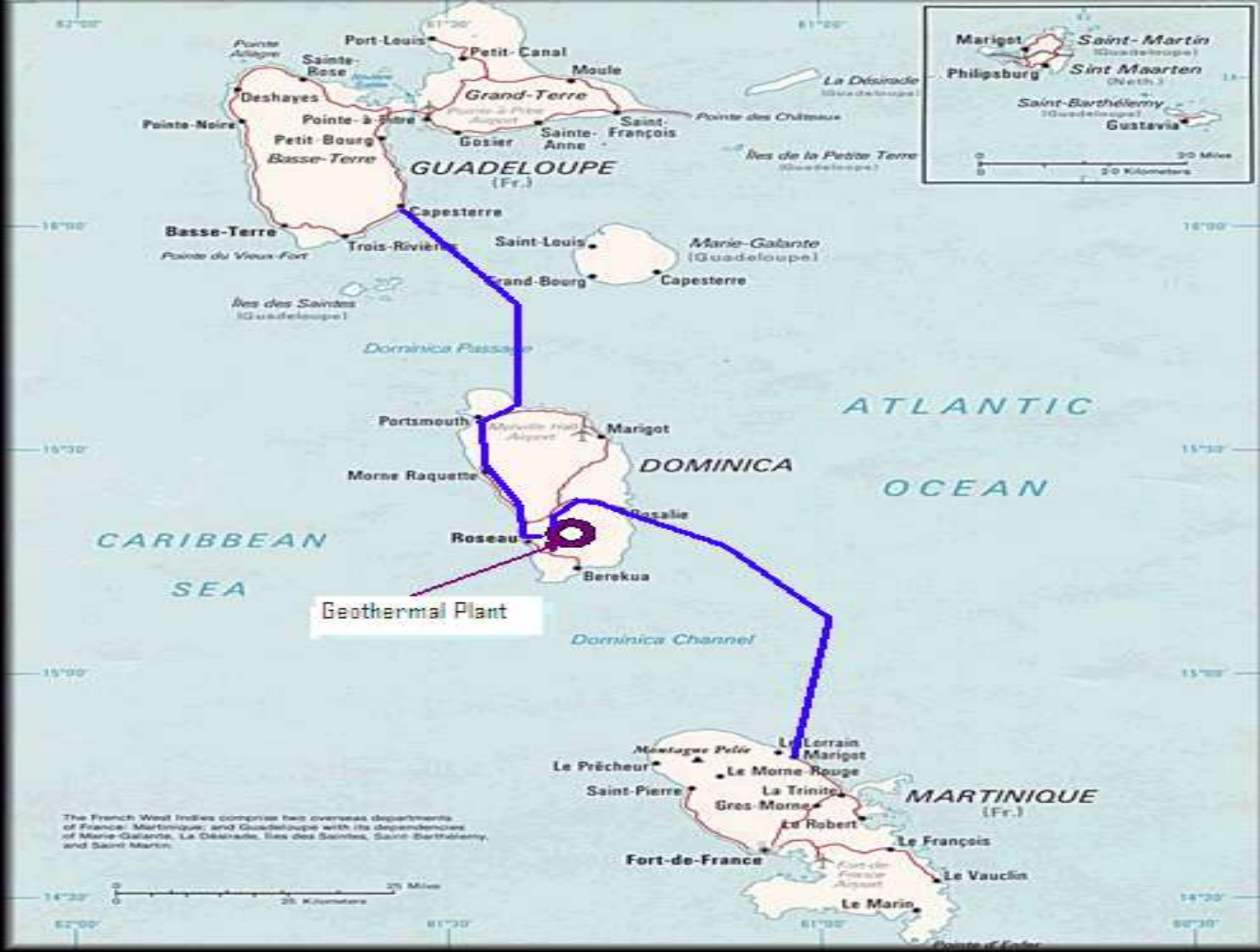


# Dominica



- USDOE estimates potential of 1390MW's
- Geology and engineering by Dominica Geothermal Power Company in 1990's
- Part of OAS Study area
- Presently the subject of a two year EU study to evaluate geothermal resources in Wotten Waven area, study the feasibility of an undersea cable link Guadeloupe-Dominica-Martinique, and conduct an Environmental Impact Study. Put out drilling RFP
- WIP issued Geothermal Exploration and Development License on July 24, 2008
- Exploration commenced in August 2008
- WIP filed Drilling EIA April 15, 2011. Awaiting Government approval





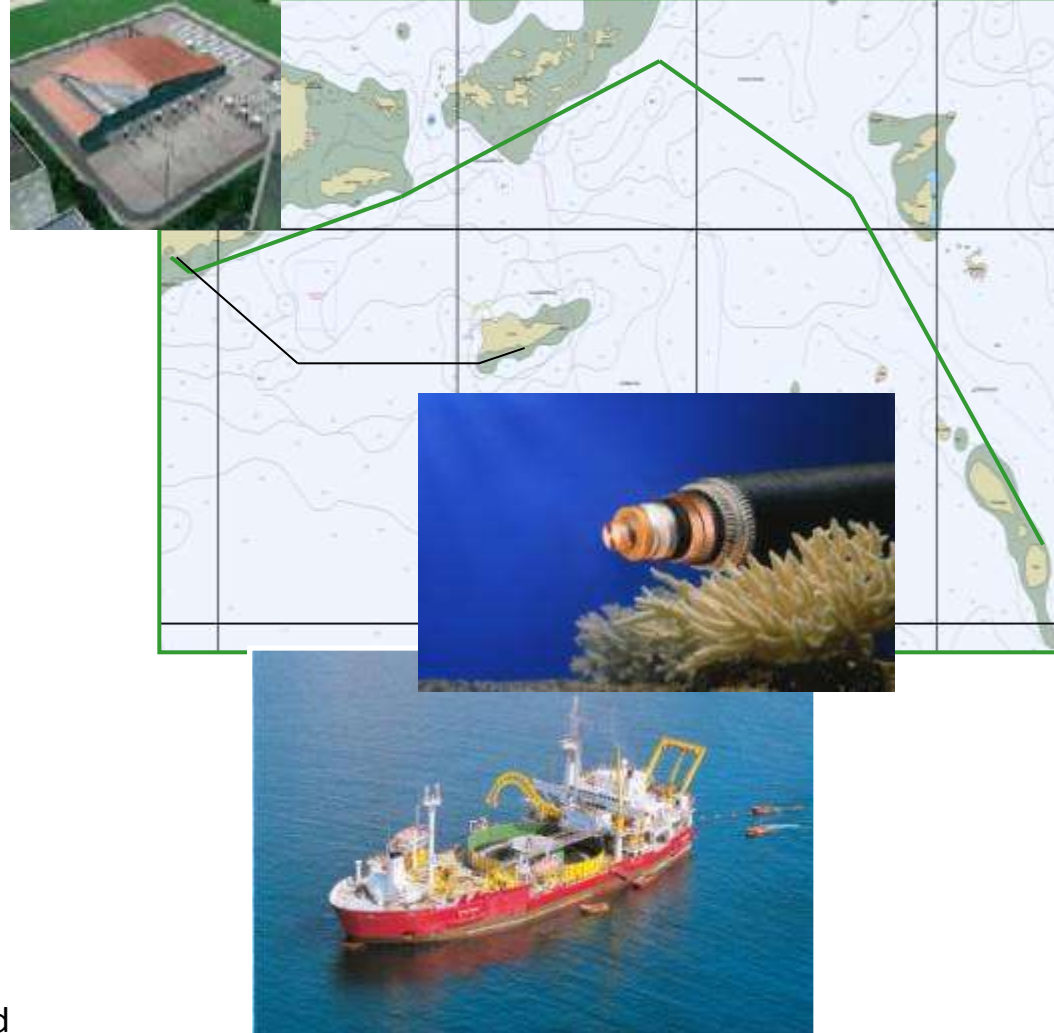
## Nevis – Puerto Rico

Route depth max 1000m  
Route length: 400 km  
Cable connection: 350kV HVDC  
IRC  
MW: 400  
Insulation type: Mass  
Impregnated Paper  
Estimated cost (\*) for cable  
system  
incl.conventional converter  
stations: 575 M US\$

## Puerto Rico –St Croix

Route depth max 1650m (to be verified)  
Route length:170 km  
Cable connection: 150kV HVDC IRC  
MW: 60  
Insulation type: Mass Impregnated Paper  
Estimated cost (\*) for cable system incl.  
VS converter stations: 195 M US\$

(\*) Cable manufacturing, transport, lay on seabed and protected to 100m water depth. Based on 4500 US\$/tonne for Cu and 1400 US\$/tonne for Pb and 1 US\$ = 6,5 NOK, 1 US\$ = 0,76 Euro



# Puerto Rico – St Thomas (USVI)

Route depth max 85m

Route length: 97 km

Cable connection: 132kV

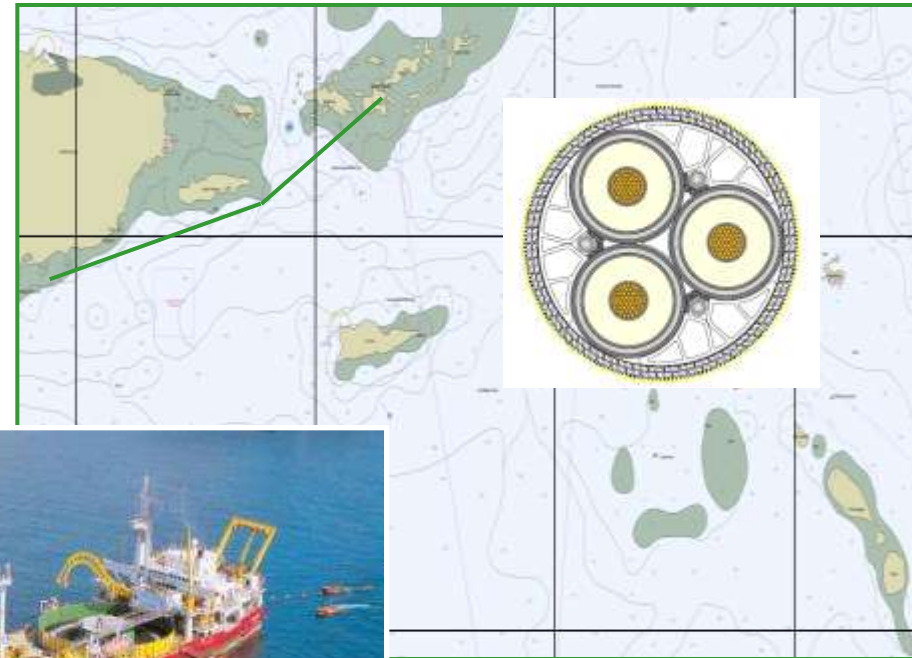
HVAC

Insulation type : XLPE

MVA: 100

Estimated cost (\*)

for cable system: 65 M \$



(\*) Cable manufacturing, transport, lay on seabed and protected to 100m distance from shore. Based on 4500 US\$/tonne for Cu and 1400 US\$/tonne for Pb and 1 US\$ = 6,5 NOK, 1 US\$ = 0,76 Euro